

## **COMMUNITY INVENTORY**

The local community, in relation to hazards and risk, can be broken into 5 key categories:

- 1) Current Land Use
- 2) Higher Risk Structures
- 3) Non-Structural Elements of Buildings
- 4) Critical Facilities
- 5) Lifelines

### **Current Land Use**

Land development and use, from zoning for specific types of uses, to standards used to build structures, to the manner in which the community is maintained plays a major role in the overall assessment of risk. Since there is no such thing as a risk free environment, communities establish minimum safety standards in the form of laws and regulations which include building codes, fire prevention codes and zoning ordinances. These have been established over a long period of time and are usually improved based on experience and increased technical knowledge.

Construction standards have been developed through various international organizations which update the codes and print new editions every three years. Such codes as the Uniform Building Code, Uniform Fire Code, Uniform Plumbing Code, Uniform Mechanical Code and the National Electric Code have been adopted by the City Council of the City of Sunnyvale every three years. The purpose of the codes is to provide standards to safeguard life, health, property and public welfare by regulating and controlling the design, construction, quality of materials, use and occupancy, location and maintenance of all buildings and structures within Sunnyvale. Modern criteria for seismic design and construction have been included in the Uniform Building Code since 1973. No major changes in seismic standards have occurred since 1984. These codes are enforced by the Departments of Public Safety and Community Development.

The majority of industrial zoned land lies in the northern portion of town which is considered to be more vulnerable to damage resulting from an earthquake. This takes on particular importance when recovery after a disaster is considered. When businesses are not properly prepared for a disaster such as an earthquake, their buildings and contents will likely suffer greater damage and slow their recovery. This affects employment, the general economy and the ability of the entire community to recover. Recovery problems can continue for years after an earthquake, or other disaster as we have witnessed in the Santa Cruz and Oakland areas after the 1989 Loma Prieta earthquake.

Areas that contain the highest concentration of hazardous materials are in the highest seismic risk zones. Improperly stored toxic materials can be spilled and released into the atmosphere exposing thousands of people to extremely high levels of risk. To address this issue, in 1983, Sunnyvale adopted Municipal Code Title 20, the purpose of the code is to put stringent controls on the storage, use, handling, and dispensing of regulated materials. These controls include, seismic protection, secondary containment and electrical grounding and bonding for dispensing and use. Furthermore, the storage ordinance requires flammable storage cabinets and chemical storage cabinets to be seismically braced and contain self-closing/self-latching equipment. Additionally, in 1990, the newly adopted Toxic Gas Ordinance further established controls for toxic gases, one which includes seismic detection.

The regulation of new development offers the most practical opportunity for preventing losses from seismic and geologic processes. Although the city is approximately 98% developed, Sunnyvale's practice of requiring a geotechnical report (for certain developments/redevelopments north of Highway 237) to define and delineate any seismic hazard, prior to the approval of a project, is an important practice that will help mitigate the effects of the next big earthquake in Sunnyvale.

Policies on the use and development of land need to take seismic, geologic and other hazards into consideration in order to avoid creating new hazards or increasing the level of risk from existing hazards, and whenever possible, reduce the levels of risk posed by existing land uses. Sunnyvale's long range goals and policies are established with risk reduction in mind while at the same time providing for the community's social and economic needs. Achieving safety in both existing and future development can be guided by asking the questions "Does it provide reasonable safety?" and "Is the cost of achieving acceptable risk commensurate with the benefits gained?".

### **Higher Risk Structures**

Structures that have high or involuntary occupancies are particularly important in evaluating risk. High occupancy structures include large apartment complexes, major employment centers, auditoriums, shopping centers and other places of assembly. Structures that have involuntary occupancies are those that usually house a segment of the community dependent upon others for their safety. These occupancies include schools, day care centers, hospitals, convalescent homes and jails.

Structures may also be in the higher risk category because of age or type of construction. These structures may include: 1) those constructed prior to the adoption and enforcement of local codes requiring earthquake resistant building design; 2) those constructed of unreinforced masonry (URM); 3) those which exhibit any of the following characteristics: exterior parapets or ornamentation that may fall off; exterior walls that are not anchored to the floors, roof or foundation; sheeting on roofs or floors incapable of withstanding lateral loads; non-ductile frame construction. Of particular concern was the need to identify URM buildings. URM buildings are extremely vulnerable to seismic shaking and have performed very poorly in past earthquakes. In 1986 the state legislature passed a law that required all jurisdictions to identify hazardous URM buildings by January 1990. It further

requires jurisdictions to establish a mitigation program and notify building owners that their structures are potentially hazardous in earthquakes. Cities must also submit information on potentially hazardous buildings and hazard mitigation programs to the Seismic Safety Commission. The City of Sunnyvale has complied with the State mandated URM Law by setting up a voluntary mitigation program. Through this program 86 buildings suspected as being of URM construction were identified. When the Community Development Department reviewed the existing building plans or inspected these buildings it was found that none of them were URM construction. However, some of these buildings did need seismic retrofitting and through this process were upgraded to required standards. There are 48 URM buildings in the 100 block of S. Murphy Avenue that are historical buildings and exempt from the 1986 law. Some of these buildings have been voluntarily upgraded to current earthquake standards when they were being remodeled for a new occupancy. Today, with the exception of a few historical buildings on S. Murphy Avenue, no URM buildings exist in Sunnyvale.

Existing dangers are not limited to URM or old buildings, as the design and construction of some modern structures may be inadequate to protect against earthquakes. To allow a greater flexibility in retrofitting existing buildings, the Uniform Code for Building Conservation (UCBC) was created by the International Conference of Building Officials. The UCBC establishes life-safety and structural requirements for URM buildings, as well as historical buildings that undergo major alteration or a change in occupancy. This code, adopted by the City Council in 1992, provides local jurisdictions with a proper set of standards to effectively mitigate hazardous buildings in a more practical and economic manner.

Residential structures which are usually wood-framed have performed well in earthquakes. Where damage has occurred in residential structures, it has usually been traceable to the lack of even minimum bracing or anchorage to the foundation or the lack of adequate bracing for chimneys. Generally, pre-1933 structures were not

designed to resist earthquakes and, if improvements to resist lateral forces have not been made, the buildings pose an extreme hazard to the occupants.

### **Non-Structural Elements of Buildings**

An extremely important factor in seismic safety considerations is the non-structural elements of buildings. All buildings contain many parts which are not related to the load-carrying members - partitions, stairs, ceilings, windows, veneers, and the like. These are subject to the same inertial forces as the rest of the structure, and they must adjust to the deflections of the building. Every significant earthquake produces damage to these non-structural elements. Falling parapets, appendages, and exterior veneers constitute the most serious hazard in most buildings. In the design of new buildings and the correction of hazards in old buildings, the attachment, anchorage and stabilization of non-structural parts is as important as the strength and rigidity of the skeleton itself. Items such as bookshelves and filing cabinets must be sufficiently secured to reduce the hazard to people inside of buildings.

In 1991 a survey of city buildings was done to determine the non-structural items needing to be secured or sufficiently braced to withstand a major earthquake. As a result of the survey the Building Services Division of the Parks & Recreation Department requested funds to make the needed changes. Funds were budgeted and approved to complete the needed improvements.

### **Critical Facilities**

Critical facilities are those facilities and parts of a community's infrastructure that must remain operational after an earthquake for a community to respond effectively. Examples include hospitals, fire stations, police and emergency services facilities, utility facilities and communications facilities. The evaluation of the vulnerability of these community facilities should include

site hazards, structural design, facility function and its importance to emergency response. Other facilities such as schools, churches and park buildings which could be used as aid centers or shelters and included in this category. Because of the possibility that a large seismic event could cause isolation of the community or parts of it, local critical facilities should not be centered in one area of the city. They should have enough basic supplies to be able to sustain operations for 72 hours (refer to Isolation After A Disaster, page 57).

Sunnyvale's emergency service buildings and other city facilities have received a considerable dedication of resources in recent years to ensure their ability to withstand a major earthquake. The new Public Safety building, constructed in 1985, was built with an additional 50% higher safety factor in design loads. Fire station 2 (Wolfe and Arques) was seismically retrofitted in 1988 as part of an expansion and remodeling project. After the Loma Prieta earthquake all of the fire stations were inspected for damage and, with the exception of Station 2, determined to be in need of retrofitting. The project at Station 3 (Mary and Ticonderoga) has been completed and the work at Station 1 (Mathilda and California) is currently in progress. The work at Stations 4 (Wolfe and Maria), 5 (Mathilda and Lockheed) and 6 (Lawrence Station Road north of Elko) is scheduled to be completed in 1993. The Community Center was seismically upgraded during the renovation project completed in 1992. Studies of the City Hall Annex building showed it did not need strengthening. The retrofitting of the warehouse or "stores" area at the Corporation Yard was completed in January, 1993. The Water Pollution Control Plant is covered in the "Lifelines" section below.

In the event the normal PG&E power supply to city facilities is lost backup generators have been installed for certain facilities. The Public Safety building has 2 backup generators to support its operations. The Corporation Yard building, Water Pollution Control Plant, Community Center, Library, City Hall, City Hall Annex and each of the 6 fire stations all have generators to supply emergency power.

### **Lifelines**

Lifelines are essential services that are necessary for the continued functioning of the community following a disaster. They include utilities (gas, electricity, water and sewer communications), city streets, major highways, bridges and railway lines. Information on age, service redundancy, condition and location help planners assess the likelihood of failure during a seismic event.

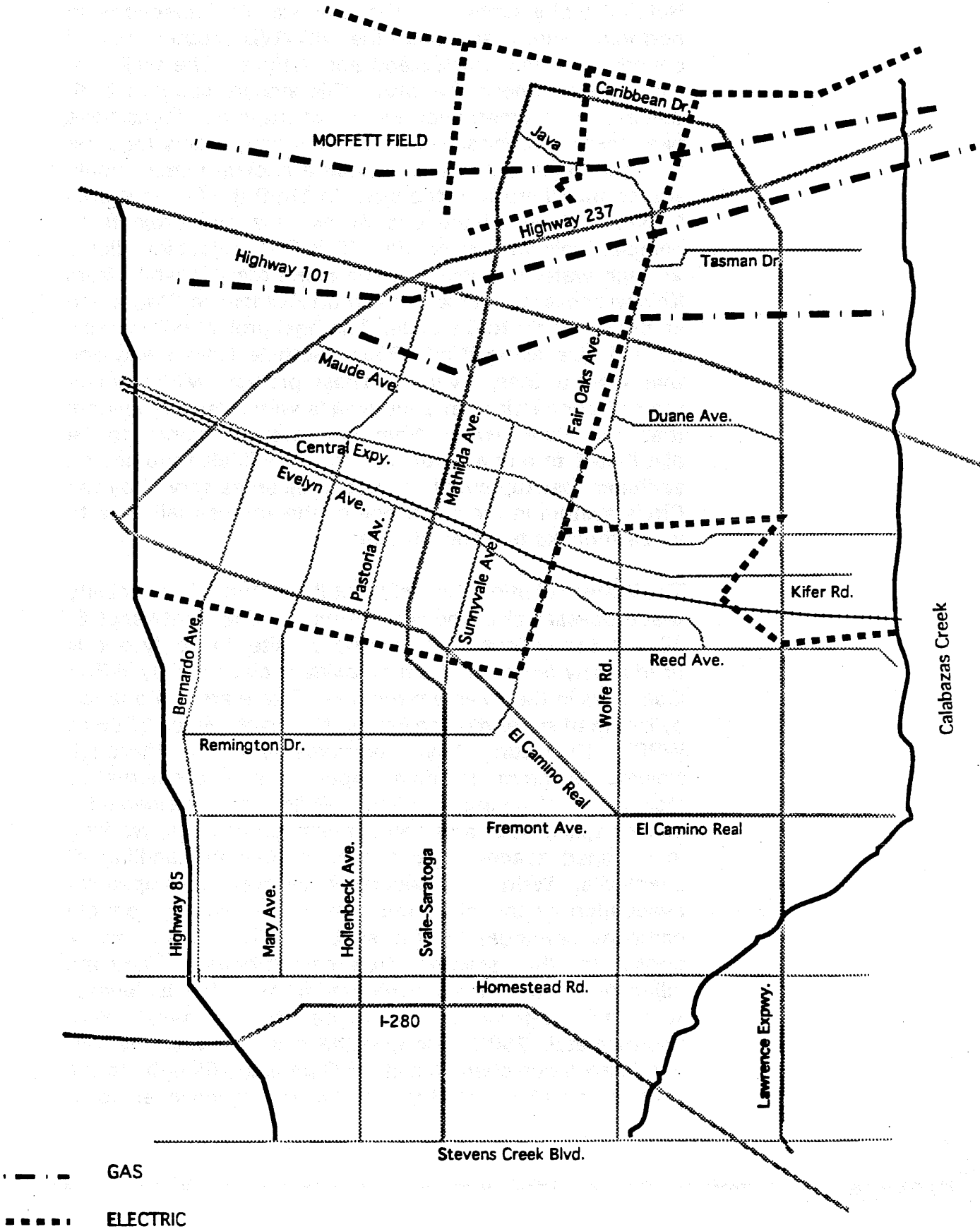
Pacific Gas and Electric Company provides the natural gas and electrical power for Sunnyvale. The severity of damage to these utilities resulting from an earthquake and what effects it will have is very difficult to forecast. Figure 10, page 54, indicates the location of major gas and electric lines in the city. PG&E has 3 electrical sub-stations in the Sunnyvale area - the Lawrence Sub-Station (off Fair Oaks Avenue east of Weddell Court), the Britton Sub-Station (off of Kifer Road near Kifer Court) and the Wolfe Sub-Station (at the Homestead & Blaney PG&E facility).

PG&E's backup power supply network is comprised of an electrical grid of multiple transmission lines. If power is interrupted from a particular supply, service from other sources can be obtained. Areas within the city that experience a sustained interruption may, dependent upon loading, be switched to different circuits. PG&E has planned a \$1 million improvement project to install automatic switches at the 3 Sunnyvale sub-stations. The project is scheduled to be completed in 1994. The installation of the automatic switches will help minimize power interruptions and restore power quicker when outages do occur.

Sunnyvale has four sources of water in the city. California Water Service Company serves several pockets of former unincorporated areas annexed into the city in 1979. This private company continues to provide service to these areas. The rest of the city is served by the City of Sunnyvale's water system that is supplied by San Francisco's Hetch Hetchy system, the Santa Clara Valley Water District (SCVWD) and 10 city wells. Water from

# Major Gas and Electric Lines

FIGURE 10





Hetch Hetchy comes to the city via 7 connections in northern Sunnyvale and the SCVWD supply via 2 connections near Homestead and Wright. The wells are located throughout the city. This system supplies both domestic and emergency water for the city. Plans have been made to connect these water supply mains together in a grid system that will provide a backup water supply source for all areas of the city. In 1990 the Public Works Department completed one of two planned projects to complete this interconnection. This first project installed a 24 inch water transmission line along Mary Avenue from Knickerbocker to Fremont, west on Fremont to Wright and south on Wright to Cascade. The final project will install a 24 inch line along Wolfe Road south to Homestead and then west to Mary Avenue. These projects will complete the grid connections in Sunnyvale's water delivery system that will allow water from any supply source to be distributed to any area of the city. It will also provide an additional backup supply source in all areas served by the City's system in the event one of the sources fails due to an earthquake or other disaster.

The Water Pollution Control Plant (WPCP) is a large facility that processes all of the city's sewage. The plant keeps 8-10 one ton cylinders of chlorine on site, but only one is used at any one time. Sulfur dioxide is also used by WPCP Operators in the treatment process. There are 4-6 one ton cylinders of sulfur dioxide kept at the plant. Since 1986 all WPCP Operators have participated in a thorough training program in plant operations and emergency incidents. Training includes drills for chlorine/sulfur dioxide spills, leaks and containment procedures; working in confined spaces; plant evacuation and handling of chemicals. Written procedures have been developed for evacuation of the plant and the chlorine/sulfur private company continues dioxide system. The city uses 2 ponds in the sewage treatment process. They are adjacent to the plant and separated from the bay by levees. A recent engineering study identified 1 weak spot approximately 250 feet long in the levee between the east pond circulation channel and the Guadalupe Slough. In the event of an major earthquake this area of the levee could

fail. If the levee fails salt water from the bay would intrude into the ponds at high tide (the pond is lower in elevation than the slough) and partially treated sewage from the pond would mix with bay water. A geotechnical survey is currently being done to determine the options available and the cost to strengthen the levee. The WPCP has 3 generators normally used every day that supply approximately 30% of the electrical needs of the plant. In the event of a PG&E power loss these generators supply enough power to run the entire primary sewage treatment process and the power needed for the office buildings. The generators are powered by a blend of PG&E supplied natural gas and WPCP supplied methane gas that is a by-product of the sewage treatment process. There are plans to purchase additional generators in the next few years that will supply all of the power needs for the plant.

Sunnyvale has 46 major roadway overcrossings and bridges on its city streets and freeways within the city limits. There are many more smaller roadway bridges over creeks and flood control channels, primarily in residential areas. The main concern of planners is the ability of the city's primary overcrossings and bridges to withstand a major earthquake. After experiencing the damage to the elevated freeways in San Francisco and Oakland during the 1989 Loma Prieta earthquake significant concerns were voiced about the seismic safety of California's numerous roadway bridges and overcrossings. Responding to these concerns, the California Legislature passed Senate Bill 36X in late 1989. This law established the California Seismic Retrofit Program which provides funding for a statewide seismic retrofit program for all publicly owned transportation structures in California. The California Department of Transportation was required to coordinate the inspection of all overcrossings and bridges in the state. Two of Sunnyvale's overcrossings, the Mathilda and Fair Oaks bridges over the railroad tracks, qualified for funding under this program. In June, 1992, the City Council approved Sunnyvale's participation in this program. The work to retrofit these overcrossings will be completed in 1994.

### **ISOLATION AFTER A DISASTER**

After a disaster such as a major earthquake it is likely that some normal transportation routes will be blocked and communications lines will be down or overloaded. The result will be the partial isolation of some neighborhoods and possibly the community. Although less probable, isolation is a possibility during any event where major transportation and/or communication facilities are damaged. When these effects delay or prevent the delivery of emergency services into affected areas it increases the level of risk to persons and property.

Isolation has two levels that could occur simultaneously:

**INTERNAL ISOLATION** - when the City's ability to receive reports of emergencies, relay emergency information and respond to citizen's requests for help is limited by destroyed or damaged lifelines.

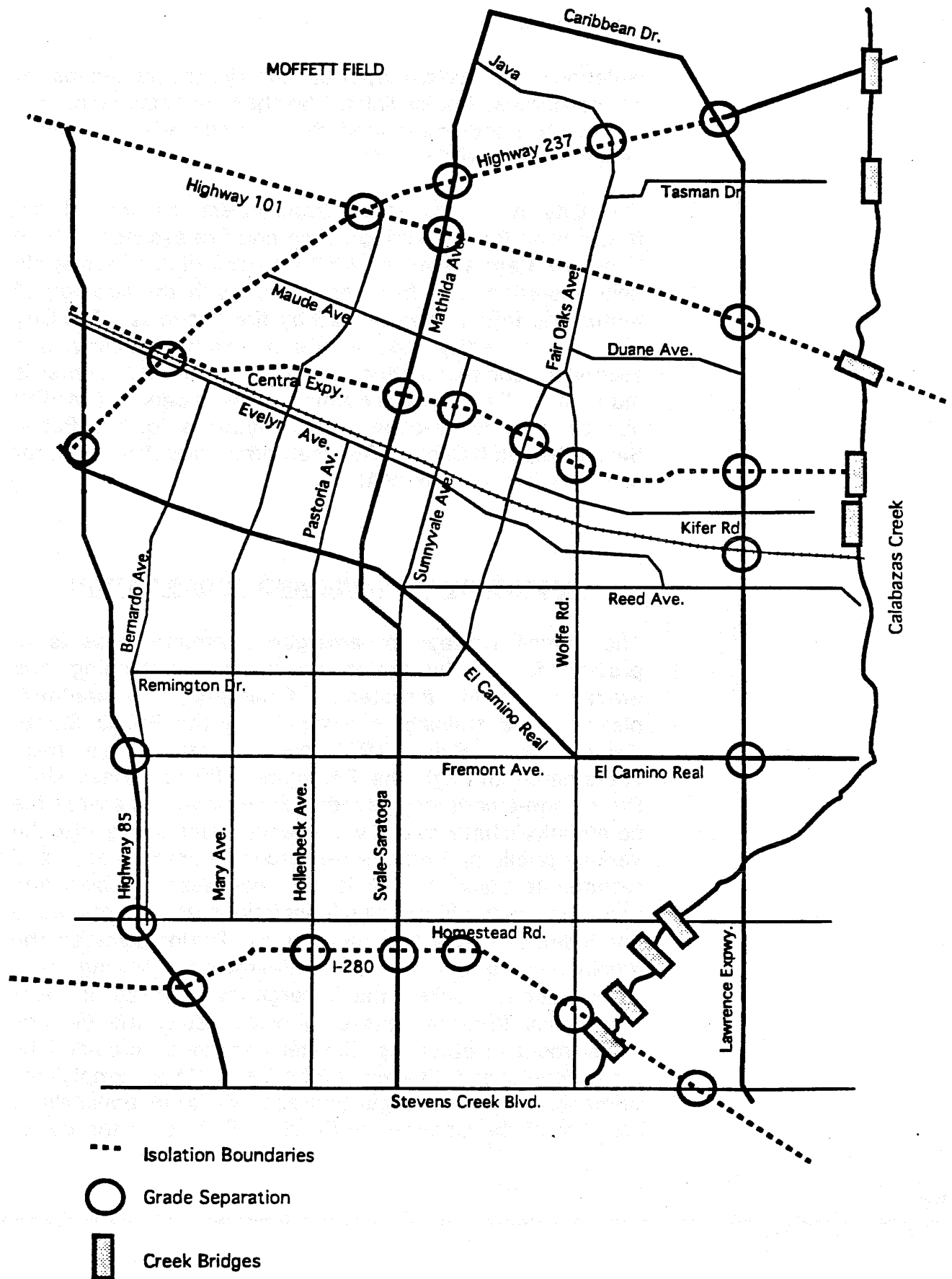
**EXTERNAL ISOLATION** - when the City's ability to communicate emergency conditions and request or receive outside emergency resources is lost due to destroyed or damaged lifelines.

### **Transportation**

Figure 11, page 58, shows the isolation that could occur due to failure of highway overcrossings on major transportation routes in the city following a catastrophic earthquake. It does not show the predicted closure of routes leading into, and out of, Sunnyvale. A study completed by the California Division of Mines and Geology for the Bay Area shows that Highway 237, portions of Highway 101, El Camino Real, Highway 85 and Highway 280 could be closed longer than 72 hours and could be subject to long delays and detours. The same holds true for all other major transportation modes including rail and air service. Moffett Field could be closed to all aviation traffic for an unspecified period of time.

# Potential Isolation Areas

**FIGURE 11**



### **Communication**

Isolation could also occur, or be complicated by, the loss of normal communication links. The ability to communicate to others the condition of and the community's emergency needs is a critical function.

The City maintains radio transmitters on mutual aid frequencies for requesting police and fire assistance from local and state agencies. Ability to coordinate mutual aid field operations has been enhanced with the addition of mutual aid frequencies utilized by fire agencies. The City does not currently have mobile dispatch capability or a secondary communications center if the primary center is inoperable. The Sunnyvale Amateur Radio Service (SARES) can be used for backup communications for the Public Safety Dispatch Center. See the Community Resources for further information on SARES.

### **EMERGENCY PLANNING AND COORDINATION**

The overall strategy of emergency preparedness is to provide for an integrated approach to planning and preparedness for disasters. Emergency preparedness planning and training is assigned to the Public Safety Department. Since 1981 the activities have been coordinated through the Emergency Preparedness Unit. During non-emergency periods it is necessary to assess the community's hazards and vulnerabilities and to organize the various public and private resources to prepare for, and respond to disasters. It is also necessary to plan and coordinate with neighboring jurisdictions, the county, state and federal emergency organizations. During disasters the employees work in the Emergency Management Organization. After the emergency phase is over Emergency Preparedness employees assist the Finance Department in obtaining disaster assistance provided by state, federal and disaster relief organizations. Employees primarily assigned emergency preparedness responsibilities are part of the Community Services Bureau of the Public

**Safety Department.** Since the 1984 Seismic Safety & Safety Sub-Element was written the city has dedicated significant resources to emergency preparedness activities. Staff assigned to these duties has grown from 1 in 1984 to 7 people today. The Federal Emergency Management Assistance Program currently provides partial reimbursement of eligible costs for specified employees. This program is funded on a year-by-year basis and its long term future is unknown.

### **The Emergency Management Organization (EMO)**

There is a difference between the day-to-day response to emergencies and the response needed to meet the demands of a disaster. Public Safety organizations are prepared to handle the routine emergencies of a city. However, disasters pose a different set of demands that the normal resources, and established levels of service cannot meet. In general terms, a disaster is defined as an emergency event which exceeds the capacity of the City to handle it in the same manner as it handles the day to day emergencies that occur, such as fires, crimes, vehicle accidents, chemical spills, etc. Effective disaster management requires the city to use all of its resources to meet emergency needs. The basic strategy is to recognize and cease non-emergency activities and concentrate all available resources on the demands generated by the disaster.

Section 8568 of the California Government Code and Chapter 2.16 of the Municipal Code require that the City develop an Emergency Plan that provides for preparation and planning to protect life and property in the event of a disaster and the effective mobilization of all resources of the City to meet any emergency/disaster. In September, 1975, the City Council adopted the first Emergency Plan. The Plan was revised by Council action in 1988. After the October, 1989, Loma Prieta earthquake, significant changes were made to the City's Emergency Management Organization (EMO). These, and other State Office of Emergency Services changes, created the need for another revised Emergency Plan which was adopted by the City Council in July, 1993.

The Emergency Plan establishes the Emergency Management Organization (EMO) to manage an emergency or disaster. The City Manager or his designee is the Director of Emergency Services. When an event, or a combination of events, begin to reach the point that a potential exists for exceeding the ability to handle the event in a routine manner, the City Manager, in his capacity as Director of Emergency Services, may direct a partial or complete mobilization of the EMO. Twenty eight functional designations in the EMO (e.g. law enforcement, communications, public information, medical, public works, care & shelter, accounting, planning) are pre-assigned along with roles and responsibilities. The city employees not pre-assigned in the Emergency Operations Center are available as an emergency work force and deployed where needed. Training in EMO operations are provided periodically.

If events evolve to the point that City resources are insufficient to respond effectively, outside resources can be requested under the local or state mutual aid agreements. Mutual aid agreements are based on the premise that no government organization can afford to employ the personnel or purchase all the equipment necessary to respond to all disasters. Sunnyvale, along with all other city and county governments in the state have signed a mutual aid agreement to assist communities that have been struck by a major disaster. This agreement is known as the California Master Mutual Aid Agreement. Additionally, there are local police and fire mutual aid agreements in place.

The responsibility for emergency planning and response rests with all levels of government. Local governments are supported by emergency organizations at the county, state and federal levels. The state-wide emergency organization is defined by the Emergency Services Act of 1970, the California Disaster Assistance Act and the California Master Mutual Aid Agreement. The federal organization is defined by the Federal Civil Defense Act of 1960 as amended, and the Federal Disaster Assistance Act (Stafford Act).

The state emergency organization is tiered into five distinct levels of response. The first level is the local organization. The second is the county, which is called the "Operational Area". In a major emergency/disaster or mutual aid situation, the operational area co-ordinates emergency services within their area and provides the link to the next tier - the region. The region is called when local and operational area resources are unable to provide the resources needed for the emergency without additional help. A region is comprised of several counties. Santa Clara County is located in the Coastal Region, which encompasses all Bay Area and coastal counties from Marin County, north to the Oregon border. The State Office of Emergency Services maintains regional offices that co-ordinate planning and response efforts for their particular area. The fourth level is the state. In a situation such as a major earthquake in the Bay Area the entire region may be incapable of handling the situation. The state coordinates the movement of resources from other regions and, if needed, aid from the fifth tier - federal agencies.

In September, 1992, Governor Pete Wilson signed into law Senate Bill 1841 which adds Article 9.5 (commencing with Section 8607) to the Government Code relating to disaster preparedness. It requires the State Office of Emergency Services to establish a standardized emergency management system by December 1, 1993 and a training course by December 1, 1994. This system has become known as SEMS. The law also requires all state and local agencies receiving state disaster assistance funds to use SEMS by December 1, 1996. OES has stated this system will be built upon a framework that includes the Incident Command System (ICS), Mutual Aid Agreements and the Operational Area concept. Sunnyvale currently uses these systems but a wide variation of them exist in California. It is unknown if the system OES establishes will require changes to our way of managing emergencies.



### **Operational Area Satellite Information System (OASIS)**

OASIS is a statewide project to develop a systematic emergency information management system using satellite communications equipment in combination with Operational Area disaster response procedures. It is designed and focused to overcome the serious delays often encountered in collecting, compiling and enhancing disaster intelligence and resource requests. For example, during the Loma Prieta earthquake response, critical disaster intelligence information in affected areas was frequently delayed (in some cases, more than twelve hours). This was usually because essential damage assessment and resource management staff were preoccupied and/or involved with emergency response operations. Delays were also encountered as a result of inter-governmental hierarchical needs to compile data into comprehensive status reports prior to forwarding the reports to higher levels in the statewide emergency management response system. OASIS has both a communications hardware and an organizational component. At present, the state will provide the communications equipment component by purchasing it with matching federal funds. In turn, each Operational Area and its affiliated cities, special districts and any other involved disaster relief agencies will be responsible for developing and implementing the Operational Area organization that is needed to coordinate/integrate local disaster response operations.

### **Public Warning**

Sunnyvale relies on police and fire personnel to provide warning to the community of local emergencies. Other emergency and disaster alerting resources include:

- The Emergency Broadcast System (EBS) communicates emergency information to the public over local radio and television stations.
- Cable TV - emergency broadcast capability has been recently acquired.

- **Sunnyvale Amateur Radio Emergency Service (SARES) are available to assist in community warning. SEPO & SNAP Networks can be accessed in small scale emergencies.**

### **War Preparedness**

Civil preparedness efforts for conventional war generally follow that for most peacetime disaster. The primary responsibility is at the federal level. Preparedness for nuclear war is substantially different and is subject to a great deal of controversy. One area of concern is whether nuclear war is survivable or not and if plans developed on the federal level are realistic in the event of nuclear war.

Congress, in the Civil Defense Act, directed the Federal Emergency Management Agency (FEMA) to develop a system of civil defense to protect life and property from both peacetime and attack-caused disasters. FEMA is working with state and local governments to develop this protection, following the guidelines of the 1980 amendments to the Civil Defense Act (e.g. emergency planning, warning systems, provision for direction and control of operations by key local and state officials). There are only two ways to protect people from life-threatening hazards: shelter or being elsewhere, out of harm's way (i.e. evacuation). Evacuation is only possible when the threat is known ahead of time, allowing people to move to a safer area (e.g. hurricane, flood, nuclear power plant accident, release of toxic substances).

Since 1984, under the integrated emergency management concept, plans are multiple-hazard, addressing all threats likely to endanger a specific local community. Thus, evacuation plans address such slowly developing threats as hurricanes, release or threatened release of a hazardous material, as well as an international crisis. Such threats allow time for people to evacuate.

## **COMMUNITY RESOURCES**

### **Sunnyvale Neighborhoods Actively Prepare (SNAP)**

SNAP is a program implemented in 1987 to establish neighborhood self-reliance in the event of a major disaster. SNAP provides the structure, the materials and the training necessary for neighborhoods to be self-sufficient for the first 72 hours following a major earthquake or other disaster. SNAP organizes each self-defined neighborhood (average of 40 homes) into six disaster task committees: Communications; Damage Assessment; First Aid; Safety and Security; Search and Rescue; and Shelter and Special Needs. These committees are ready to go into action in times of disaster to handle neighborhood needs, and are coordinated by SNAP captains (the group's leaders). Currently, there are 211 neighborhood SNAP groups, 385 SNAP Captains and over 3,800 group members. Since 1987 over 11,000 Sunnyvale residents have participated in the SNAP program.

A city-wide SNAP newsletter is distributed to SNAP captains three times a year. This newsletter provides information on emergency preparedness and other City sponsored programs. Three training sessions a year provide SNAP members with the opportunity to receive valuable emergency preparedness information. The training sessions vary from classroom instruction on various topics to urban search and rescue techniques taught at the fire station training grounds. SNAP has also established a nine person steering committee composed of a representative group of SNAP captains. These individuals work closely with the Community Services Bureau staff in making decisions for the SNAP program.

The best evaluation has been the program's continued growth, and the actions taken by SNAP groups in the wake of the Loma Prieta earthquake on October 17, 1989. While not heavily impacted, Sunnyvale experienced a number of gas leaks, toppled chimneys, power outages, and rattled nerves. SNAP members helped to take care of these needs through productive actions in their neighborhoods. SNAP provided peace of mind and helped replace uncertainty with knowledge that the neighborhood was prepared.

## **Project ARK**

Project ARK is Sunnyvale's Disaster Shelter Program, which is a cooperative effort between the City, the American Red Cross, and the four school districts in Sunnyvale (Sunnyvale Unified, Santa Clara Unified, Cupertino Unified, and Fremont Union High School District). Currently, the program involves 12 emergency container called "Arks" placed at eight school sites around the City. Each container is stocked with emergency supplies for up to 300 people for 3 days. Schools were chosen as sites for disaster shelters for several reasons. Schools are built to a stronger seismic code than most buildings, have gyms or other areas for sleeping, and feature kitchen and restroom facilities for large numbers of people. Arks have been placed at Bishop Elementary, Columbia Elementary, Lakewood Elementary, Ponderosa Elementary, Cupertino Middle School, Peterson Middle School, Sunnyvale Middle School and Fremont High School.

In the event of a disaster or other local emergency, the supplies in each ARK would be used to set up a Red Cross Mass Care Facility, also called a Disaster Shelter.

## **Sunnyvale Amateur Radio Emergency Services (SARES)**

Over 150 amateur radio operators in the community have organized as an active emergency response group called Sunnyvale Amateur Radio Services (SARES). The Sunnyvale Amateur Radio Emergency Services is made up of FCC-licensed amateur radio operators who have registered their capabilities and equipment for public service. They serve without compensation. Locally, SARES is directed by the Emergency Coordinator who is appointed by the American Radio Relay League (ARRL) Section Emergency Coordinator. A Community Service Officer in the Public Safety Department is the City's liaison with the SARES Emergency Coordinator.

The group provides assistance to the Public Safety Department at both routine special events, when additional radio communications are needed, and during emergencies/disasters. In preparation for an emergency event radio equipment and antennas have been installed at

30 locations throughout the city. The locations include the Dispatch Operations Center at the Public Safety Department, all fire stations, the Community Center, Corporation Yard, Water Pollution Control Plant, Sunnyvale Medical Clinic, two mobile home parks and many schools. In the event of an emergency or disaster SARES members report to the pre-designated locations and activate their network. The SARES network will provide a critical communication link from neighborhoods and businesses to the Public Safety Department.

#### **Sunnyvale Emergency Preparedness Organization (SEPO)**

Sunnyvale has taken a proactive approach to helping business and industry prepare for and recover from a seismic event by coordinating the Sunnyvale Emergency Preparedness Organization (SEPO). SEPO was organized in October, 1990 as a forum for business and industry representatives to share resources and information relating to emergency preparedness. The city acts as a catalyst to bring business representatives together to express their needs and discuss how they can respond to them. Bi-monthly meetings are held to hear guest speakers talk on a variety of topics, share information and discuss emergency preparedness issues. The meetings provide an opportunity to develop contacts with those who have a wide variety of insight and experience in emergency preparedness issues. The objectives are to promote communication among neighboring companies and to strengthen their relationship with each other as well as with the City. This in turn strengthens everyone's ability to respond to and recover from disasters.

Since SEPO's inception some of the larger companies such as Advanced Micro Devices, Argo Systems and Westinghouse have developed their own Emergency Response Teams and have taken steps to provide for their training needs. SEPO's mentor program matches a company with established resources and skills, such as those listed above, with another company that is just starting to develop their emergency preparedness program. To date, nine companies have been matched with mentors through this program. Five businesses have purchased a "Business Ark" similar in idea to the Arks described above. Twelve businesses have purchased amateur radio

equipment and participate in the amateur radio communications network that links them with the Public Safety Dispatch Center and each other. In response to requests this year, Emergency Preparedness Unit staff have assisted 21 companies in preparing their building evacuation plans and seven businesses in developing their emergency plans.

SEPO has coordinated training programs designed to provide professional training for industry employees. These classes include: Amateur Radio Operator, Hazardous Materials Technician Response (40 hours), Haz Mat Recertification (24 hours), Emergency Response Team (ERT), First Aid/CPR, Medical Emergency Response Training (MERT) and MERT Recertification. In FY 92/93 over 100 industry employees attended these training classes.

SEPO is directed by a steering committee of industry representatives and Public Safety employees. It is intended

to be primarily an industry directed program that over time becomes increasingly self-directed and self-sufficient.

### **POST DISASTER RECOVERY**

The recovery from a disaster needs to be as well planned as the initial emergency response. When a community has been devastated by a disaster pressure from displaced businesses and families to rebuild as quickly as possible can be overwhelming for local planning commissions and city councils. If this happens little thought will be given to correcting past mistakes, evaluating changes in land usage and their long-range effects on a community. A community

can effectively plan to recover from a disaster and with thoughtful planning those plans will provide a framework for the recovery.

Sunnyvale is taking a pro-active approach to post disaster recovery planning. Significant work is being done to develop standard operating procedures for damage assessment and disaster assistance centers to aid in the financial recovery of the community should a disaster occur.

**COMMUNITY CONDITION INDICATORS**

<b>FISCAL YEAR:</b>	<b>89/90</b>	<b>90/91</b>	<b>91/92</b>	<b>92/93</b>
<b>1. Percent of habitable* land subject to a 100 year flood</b>  * "habitable" added to indicator in FY 92/93	<b>5%</b>	<b>5%</b>	<b>5%</b>	<b>3.8%</b>
<b>2. Percentage of housing stock over 25 years of age</b>	<b>63%</b>	<b>65%</b>	<b>68%</b>	<b>71%</b>
<b>3. Number of hazardous materials spills incidents</b>	<b>96</b>	<b>65</b>	<b>56</b>	<b>32</b>
<b>4. Number of facilities requiring hazardous materials storage permits</b>  * Change in method of calculation	<b>832</b>	<b>681 *</b>	<b>674</b>	<b>659</b>
<b>5. Number of facilities requiring toxic gas permits</b>	<b>NA</b>	<b>49</b>	<b>44</b>	<b>25</b>
<b>6. Number of active SNAP neighborhood groups</b>	<b>97</b>	<b>166</b>	<b>189</b>	<b>211</b>
<b>7. Number of businesses assisted with emergency preparedness planning (SEPO started in Oct. 90)</b>	<b>66</b>	<b>71</b>	<b>89</b>	<b>103</b>
<b>8. Percent of roadway overcrossings meeting current seismic standards</b>	<b>100%</b>	<b>96%</b>	<b>96%</b>	<b>96%</b>

## **INTERRELATIONSHIP WITH OTHER SUB-ELEMENTS**

**The General Plan of the City of Sunnyvale is composed of seven elements: Transportation, Community Development, Environmental Management, Public Safety, Socio-Economics, Cultural and Planning Management. The Seismic Safety and Safety Sub-Element is part of the Community Development Element. This element included five other sub-elements: Land Use, Open Space, Housing and Community Revitalization and Community Design.**

**The interrelationship of the Seismic Safety and Safety Sub-Element with other sub-elements is summarized below.**

### **Fire Services Sub-Element**

**Policy 4.2A.4      Conduct field operations and emergency scene management in a safe, effective, and efficient manner.**

#### **Action Statements**

- 4.2A.4c      Maintain liaison with the Department of Public Works to assure an adequate and well-maintained water supply system for fire suppression purposes.**
- 4.2A.4d      Identify and adopt methods and policies which provide safety, improve communications, and enhance command and control of emergency incidents.**
- 4.2A.4e      Maintain policies and agreements with other agencies that provide for mutual emergency assistance when required.**

**Policy 4.2B.2      Operate a response system that will provide effective control and investigation of hazardous materials and emergencies.**



**Action Statements**

- 4.2B.2a** Provide a specially trained and equipped response team capable of mitigating emergencies resulting from hazardous material leaks, spills and discharges and conduct related inspections and permit activities.

**Policy 4.2C.1** Provide controls based on fire and life safety codes, ordinances, permits and field inspections. Promote compliance through enforcement efforts.

**Action Statements**

- 4.2C.1a** Revise and adopt appropriate codes, ordinances, and policies significant to fire and life safety issues.

- 4.2C.1d** Conduct building and permit inspections for safety at a frequency sufficient to promote compliance with appropriate codes and ordinances.

**Policy 4.2C.2** Coordinate a comprehensive program designed to control and mitigate harmful effects resulting from the storage, use and transport of hazardous materials.

**Action Statements**

- 4.2C.2a** Conduct inspection and permit activities consistent with laws and requirements governing the use and storage of hazardous substances.

- 4.2C.2b** Participate in cooperative efforts directed toward remedying problems associated with hazardous materials.

**Policy 4.2C.3** Heighten public consciousness of fire and life safety in ways citizens can not only prevent fires from starting but react properly to emergencies when they occur.

**Action Statements**

- 4.2C.3g**      Coordinate appropriate activities through the Community Services Bureau.

**Surface Runoff Sub-Element**

**GOAL C:**      Ensure that flood hazards are recognized.

**Policy C.2:**   Prevent flooding to protect life and property.

**Action Statements (primarily from the Seismic Safety & Safety Sub-Element)**

- C.2.a**      Encourage the SCVWD to periodically reevaluate the capacity of creeks and channels.
- C.2.b**      Encourage the SCVWD to maintain creeks and channels to remove flow-inhibiting vegetation, debris and silt.
- C.2.c**      Encourage the SCVWD to maintain dikes and levees at least 3 feet above the 1% flood level and to inspect and repair damage caused by burrowing animals.
- C.2.d**      Continue to maintain the flood plain management practices outlined by the Federal Emergency Management Agency (FEMA) and the Army Corps of Engineers.

**Land Use Sub-Element**

**Policy 2.1C.4**      Revitalization of existing residences is encouraged, so long as additions and accessory uses are within the scale of that residential area.

**Policy 2.1D.1**      Efforts shall be taken to minimize, where possible, the areas affected by the 100 year flood.

**Action Statement**

- 2.1D.1** Where areas do exist that are affected by the 100 year flood, new residential uses shall not be allowed to locate in those areas.

**Housing and Community Revitalization Sub-Element**

**Policy B.1** Continue to encourage property owners to maintain existing developments in a manner which enhances the City. Properties should be aesthetically pleasing, free from nuisances and safe from hazards.

**Action Statement**

- B.1.a** The City should continue to offer technical assistance to homeowners to aid them in maintaining, upgrading and improving their property. Such assistance shall be provided by staff and a free manual on maintenance and improvement.

**Policy B.2** Continue to implement the Neighborhood Preservation Program.

**Action Statement**

- B.2.a** The City should review existing codes, ordinances and use permit conditions with the possibility of increasing enforcement or developing new codes where neighborhood and community preservation issues are involved. The emphasis, however, will be on promoting voluntary compliance.

## **GOALS AND POLICIES**

## **INTRODUCTION**

**The Seismic Safety/Safety Sub-Element establishes a set of integrated goals, policies and actions designed to promote a safe community. It is Sunnyvale's commitment to incorporate these concerns when determining city action and programs. This sub-element provides information and specific recommendations to guide decisions relevant to seismic safety and safety concerns.**

This sub-element is one of several documents in the General Plan. The goals and policies of this document affect and can be affected by other sub-elements and are intended to be integrated with them.

Emergency preparedness requires both short and long term planning and implementation. It is also a continuing educational process. Implementation of this sub-element must also be recognized as ongoing and long term. The completion of certain action statements may require years to accomplish due to operational and/or financial constraints.

The goals, policies and action statements in this sub-element are based on the following principles:

1. The citizens of Sunnyvale desire a living environment reasonably safe from natural or human caused disasters.
2. The citizens wish to maintain the basic character of the city.
3. The probability that the city will experience a major earthquake by 2020 is approximately 67%.
4. The city has not yet experienced the largest possible flood.

5. Hazard analysis and risk assessment are local responsibilities with regional implications. This responsibility requires strong local control and coordination with other local and regional agencies.
6. Effective emergency preparedness requires coordination of all levels of government and public and private community resources.
7. Effective emergency preparedness by the community can mitigate the effects of disasters. A poorly prepared community will suffer the full effects of the disaster.
8. The city will be on its own for days or weeks following a major disaster because of probable isolation and the extremely high disaster related demands for services from state and federal resources. Other communities will experience the same disaster related effects.

## **GOALS AND POLICIES**

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✓ **GOAL A:** ENSURE THAT NATURAL AND HUMAN-CAUSED HAZARDS ARE RECOGNIZED AND CONSIDERED IN DECISIONS AFFECTING THE COMMUNITY, AND THAT LAND USES REFLECT ACCEPTABLE LEVELS OF RISK BASED ON IDENTIFIED HAZARDS AND OCCUPANCY.

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✓ **Policy A1 Land Use**

Evaluate and consider existing and potential hazards in developing land use policies. Make land use decisions based on an awareness of the hazards and potential hazards for the specific parcel of land.

**Action Statements:**

- A.1.1** Encourage coordination of planning decisions, concerns and information sharing among the neighboring cities, affected agencies and interested citizen groups.
- A.1.2** Retain existing residential sprinkler and fire resistive roofing requirements.
- A.1.3** Encourage and cooperate with seismic and geologic investigations in the Sunnyvale planning area by such scientific agencies as the U.S. Geological Survey and the California Division of Mines and Geology.
- A.1.4** Maintain the current United States Geological Survey maps of all known seismic and geologic hazards located in the city.
- A.1.5** Require geotechnical reports for new developments and redevelopments north of Highway 237.

**Policy A2 Flood Hazards**

Take measures to protect life and property from the effects of a 1% (100 year) flood.

**Action Statements:**

- A.2.1** Encourage the Santa Clara Valley Water District to reevaluate the capacity of Stevens Creek, Calabazas Creek, Sunnyvale East, West and El Camino Flood Control Channels in relation to a 1% (100 year) flood.
- A.2.2** Encourage and monitor the work of the Santa Clara Valley Water District (SCVWD) in maintaining all creeks and channels in Sunnyvale free of flow inhibiting vegetation, debris and silt.

## **SEISMIC SAFETY AND SAFETY SUB-ELEMENT**

**A.2.3** Encourage SCVWD to maintain their dikes and levees at least 3 feet above the 1% flood level and to provide continued inspection and repair from damage caused by burrowing animals. ✓

**A.2.4** Maintain the flood plain management practices as outlined by the Federal Emergency Management Agency (FEMA) and the Army Corps of Engineers. ✓

**A.2.5** Participate in the National Flood Insurance Program (NFIP). ✓

### **Policy A3 Hazardous Materials**

Promote a living and working environment safe from exposure to hazardous materials. ✓

#### **Action Statements**

**A.3.1** Maintain current information on the hazardous materials used in Sunnyvale businesses and their potential hazards to the community. ✓

**A.3.2** Participate in future development of proposed state and local code changes in storage and handling methods for hazardous materials. ✓

**A.3.3** Monitor the work of the Naval Facilities Engineering Command, Western Division (San Bruno), to ensure proper environmental clean up of the Moffett Field land. ✓

**A.3.4** Use the Santa Clara County Hazardous Waste Management Plan (CHWMP) as Sunnyvale's policy document and planning guide for planning off-site hazardous waste management facilities and all hazardous waste management programs within the city.



**Policy A4 Aviation Hazards**

Make planning decisions that establish and/or maintain a safe mix of aviation and land use for the areas affected by Moffett Field.

**Action Statements:**

- A.4.1 Oppose any effort to promote Moffett Field for civil/general aviation.
- A.4.2 Consider the Air Installation Compatible Use Zone (AICUZ) in decisions concerning appropriate land use within the vicinity of Moffett Field.

**Policy A5 Essential Services**

Maintain lifelines\* in good operating condition to lessen damage and increase survivability after a major disaster.

**Action Statements:**

- A.5.1 Encourage the state and county to maintain and/or improve their overcrossings to increase their ability to survive a major seismic event.
- A.5.2 Encourage Pacific, Gas and Electric and Pacific Bell to assess maintain and, if necessary, improve their facilities to increase their ability to survive a major seismic event.
- A.5.3 Study, evaluate and fund the improvements needed to the east pond levee at the Water Pollution Control Plant to increase its ability to survive a major earthquake.

\* Lifelines are essential services necessary for the continued normal functioning of the community, e.g. water, gas, electricity, transportation and communication lines.

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**GOAL B: ENSURE THAT THE CITY, ITS CITIZENS, BUSINESS AND INDUSTRY ARE PREPARED TO EFFECTIVELY RESPOND TO MAJOR EMERGENCIES.**

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**Policy B1 Emergency Response Facilities**

Maintain and construct city facilities utilized for emergency response so that they remain operable after a major seismic event.

**Action Statements:**

**B.1.1** Inspect city owned facilities to ensure compliance with seismic safety/safety standards as needed. Fund capital projects when necessary to bring critical facilities up to seismic standards.

**B.1.2** Construct new city facilities to meet or exceed seismic safety/safety standards so that they will remain operable after a major earthquake or disaster.

**Policy B2 Emergency Management Organization**

Provide for the emergency management of the city in order to protect life and property in the event of a disaster.

**Action Statements:**

**B.2.1** Provide annual training for those persons assigned to the Emergency Management Organization (EMO).

**B.2.2** Annually review the EMO chart, responsibilities and tasks so that it reflects sound emergency management principles.

- B.2.3** Maintain an Emergency Operations Center (EOC) for direction and control of disaster response and recovery. ✓

**Policy B3 Emergency Planning & Coordination**

Provide an integrated approach to planning and preparedness for emergencies and disasters. ✓

**Action Statements:**

- B.3.1** Identify, assess and maintain data on hazards to the community. ✓

- B.3.2** Maintain an Emergency Plan and update it as necessary. ✓

- B.3.3** Identify and maintain communications and coordination with community resources that will provide assistance during emergencies. ✓

- B.3.4** Coordinate planning and training with other agencies and jurisdictions to provide an effective and coordinated response to any emergency/disaster. ✓

- B.3.5** Train employees and operational units in emergency preparedness and disaster response procedures appropriate to their job function. ✓

- B.3.6** Maintain communication with and provide training exercises to improve coordination between city staff and private support organizations. ✓

- B.3.7** Evaluate city resources and make recommendations for improving city self-reliance during emergencies. ✓

- B.3.8** Provide assistance to residents and businesses in emergency preparedness. ✓

**Policy B4 Schools**

Provide information and assistance to public/private schools and day care centers to plan and prepare for emergencies and disasters.

**Action Statements:**

**B.4.1** Assist schools and day care centers in emergency preparedness.

**B.4.2** Encourage private schools and day care centers not constructed under the Field Act to evaluate and improve their buildings for seismic safety.

**B.4.3** Assist in the development of emergency preparedness curriculum and training materials for schools and day care centers.

**Policy B5 Business and Industry**

Provide information and assistance to business and industry to plan and prepare for emergencies and disasters.

**Action Statements:**

**B.5.1** Provide available emergency preparedness information to businesses and industries that request assistance.

**B.5.2** Encourage business and industry to plan for recovery from catastrophic events.

**Policy B6 Community**

Provide the citizens of Sunnyvale information, encouragement and assistance with emergency planning and preparedness.

**Action Statements:**

- B.6.1** Provide citizens with information on self-help during and after a disaster. ✓
- B.6.2** Provide speakers for emergency preparedness talks to interested citizens and community groups. ✓
- B.6.3** Identify and coordinate community volunteers that wish to participate in planning, preparedness or response activities. ✓

**Policy B7 Communications**

Provide emergency radio communications for coordination of emergency response and the capability to communicate with outside agencies and citizens. ✓

**Action Statements:**

- B.7.1** Periodically review emergency radio capabilities to enhance survivability during a major disaster. ✓
- B.7.1** Assist and encourage volunteer amateur radio operators to prepare for citizen band radio operations during a disaster or emergency. ✓

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**GOAL C: ENSURE THAT THE CITY, ITS CITIZENS, BUSINESS AND INDUSTRY ARE PREPARED TO RECOVER FROM DISASTERS.** ✓

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**Policy C1 City Government**

Provide for the continuation of city government and services following a major disaster. ✓

**Action Statements:**

**C.1.1** Maintain a thorough and current Emergency Plan that provides information for the continuation of city government immediately following a disaster. ✓

**C.1.2** Plan for the recovery and resumption of all city operations after a disaster. ✓

**Policy C2 Citizens and Business/Industry**

Encourage citizens and business/industry to plan for recovery from disasters. ✓

**Action Statements:**

**C.2.1** Provide assistance to local businesses in planning for recovery and resumption of business after a disaster. ✓

**C.2.2** Provide guidance to citizens on disaster recovery through brochures, talks and other public information methods. ✓

**C.2.3** Encourage citizens/businesses to purchase earthquake or other catastrophic insurance coverage. ✓

## **UPDATING THE SEISMIC SAFETY AND SAFETY SUB-ELEMENT**

Periodic updating can provide current information and measure success achieved toward meeting the stated goals. Annual updates should be made for data which lends itself to yearly review. Ten year updates should also include data from the Community Development and Public Works Departments, the United States Geological Survey and the California Division of Mines and Geology.

### **Annual:**

- Review hazards and land use.
- Review public and private sectors preparedness planning.

### **Ten Year:**

- Reevaluate all goals, policies and action statements for success and appropriateness
- Identify new trends related to preparedness.
- Evaluate data from other agencies used in the Sub-Element.
- Anticipate future conditions

## **APPENDIX A - GLOSSARY OF TERMS**

<b>Active Faults</b>	<p>Active faults are faults which show evidence of any or all of the following:</p> <ol style="list-style-type: none"><li>1. Topographic or physiographic expressions suggestive of geologically young fault movements.</li><li>2. Fault creep.</li><li>3. Records of surface rupture within or adjacent to the study area in historic time.</li></ol>
<b>Alluvial Fans</b>	<p>Alluvial fans are built by rivers flowing from mountains onto lowlands. They are low cone-shaped heaps, steepest near the mouth of the valley, and sloping gently outward with ever decreasing slope.</p>
<b>Alluvium</b>	<p>A general term for the sediments laid down in river beds, flood plains, lakes, fans at the foot of the mountain slopes, and estuaries during relatively recent geologic times.</p>
<b>Amplification</b>	<p>The increase in earthquake ground motion that may occur to the principal components of seismic waves as they enter and pass through different earth materials.</p>
<b>Anomaly</b>	<p>A deviation or inconsistency of a specific land feature from uniformity with the larger area.</p>
<b>Aquifer</b>	<p>A permeable layer of rock that contains enough group water to yield significant quantities of water to wells and springs.</p>
<b>Displacement</b>	<p>The dislocation of one side of a fault relative to the other side resulting from fault movement.</p>
<b>Earthquake</b>	<p>Perceptible trembling to violent shaking of the ground, produced by sudden displacement of rocks below and at the earth's surface.</p>
<b>Earthquake focus</b>	<p>See "Focus".</p>



<b>Epicenter</b>	The geographical location of the point on the surface of the earth that is vertically above the earthquake focus.
<b>Focal depth</b>	Depth of an earthquake focus below the ground surface.
<b>Focus</b>	The point within the earth which marks the origin of the elastic waves of an earthquake.
<b>Free face</b>	A sloping surface exposed to air or water such that there is little or no resistance to lateral movement of earth materials.
<b>Geology</b>	The science which treats of the earth, the rocks of which it is composed, and the changes which it has undergone or is undergoing.
<b>Ground failure</b>	A situation in which the ground does not hold together such as in a landslide, mud flow or liquefaction.
<b>Ground lurching</b>	Undulating waves in soft saturated ground that may or may not remain after the earthquake.
<b>Ground strength</b>	The limiting stress that ground can withstand without failing by rupture or continuous flow.
<b>Habitable land</b>	Land that is zoned for commercial, industrial, office, public or residential development.
<b>Infrastructure</b>	The substructure or underlying foundation of the city; especially the basic installations and facilities on which the continuance and growth of the city depends. This includes schools, roads, communications systems, utilities, etc. (See Lifelines)
<b>Intensity</b>	A nonlinear measure of earthquake size at a particular place as determined by its effect on persons, structures, and earth materials. The principal scale used in the United States today is the Modified Mercalli, 1956 version. Intensity is a measure of effects as contrasted with magnitude which is a measure of energy. They are not the same.

<b>Inundation</b>	Flooding caused by water topping a dam or water released by dam, reservoir, levee or other break.
<b>Lifelines</b>	Lifelines are the utility services and communication and transportation lines necessary for the continued functioning of the community. (See Infrastructure)
<b>Liquefaction</b>	A process by which a water saturated sand loses coherence when shaken. Involved is the collapse of sand grains into intergranular voids which induces an increase in pore pressure and loss of strength. This loss of strength leads to a quicksand condition in which objects can either sink or float depending on their density.
<b>Magnitude</b>	The rating of a given earthquake is defined as the logarithm of the maximum amplitude on a seismogram written by an instrument of specified standard type at a distance of 62 miles from the epicenter. It is a measure of the energy released in an earthquake. The zero of the scale is fixed arbitrarily to fit the smallest recorded earthquakes. The scale is open ended but the largest known earthquake magnitudes are near 8-3/4. Because the scale is logarithmic, every step of one magnitude unit means a 32 fold increase in energy release. Thus, a magnitude 7 earthquake releases 32 times as much energy as a magnitude 6 earthquake. Magnitude is <u>not</u> the same as intensity.
<b>Plate tectonics</b>	An Earth model in which a small number (10-25) of large, broad, thick plates of the Earth's surface believed to "float" on an underlayer and move more or less independently, grinding against each other like ice floes in a river. The plates are propelled from the rear by sea-floor spreading. The continents form part of the plates and move with them like blocks of wood in an ice floe.
<b>Sediment</b>	Solid material settled from suspension in a liquid.
<b>Seismic</b>	Pertaining to an earthquake or earth vibration, including those that are artificially induced.
<b>Seiches</b>	A wave generated in an enclosed body of water.

**RESOLUTION NO. 187-93**

**A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF  
SUNNYVALE AMENDING THE GENERAL PLAN BY REVISING THE  
SEISMIC SAFETY AND SAFETY SUBELEMENT**

WHEREAS, the Department of Public Safety has proposed an amendment to the 1972 General Plan of the City of Sunnyvale, as amended, by revising the Seismic Safety and Safety Subelement, which proposed Subelement is set forth in Report to Council No. 93-449 dated September 28, 1993; and

WHEREAS, a Negative Declaration has been prepared in compliance with the California Environmental Quality Act of 1970, as amended, and City Council Resolution No. 193-86;

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF SUNNYVALE THAT:

1. The City Council finds and determines that the revision conforms with the requirements provided for in the Sunnyvale Municipal Code, that it is a suitable and logical change of the General Plan for the development of the City of Sunnyvale, and that it is in the public interest.

2. The revised Seismic Safety and Safety Subelement, as adopted, a copy of which is on file in the Office of the City Clerk of the City of Sunnyvale, is hereby incorporated into the 1972 General Plan of the City of Sunnyvale.

3. The Mayor and City Clerk are directed to endorse the amendment to the 1972 General Plan of the City of Sunnyvale and to show that the same has been adopted by the City Council.

4. The City Clerk is directed to file a certified copy of the amendment to the 1972 General Plan of the City of Sunnyvale


<b>Seismic Velocity</b>	The rate of propagation of an elastic wave. The velocity depends upon the type of wave and the elastic properties and density of the Earth material through which it travels.
<b>Seismograph</b>	An instrument that writes a permanent continuous record of earth vibrations.
<b>Seismology</b>	The science of earthquakes and related phenomena.
<b>Soil profile</b>	A vertical section of a soil that shows all its layers and the material from which it was derived.
<b>Subsidence</b>	A shrinking of a large area of land, usually observed as a shrinkage.
<b>Tectonics</b>	A study of the origin, relations, and evolution of structural features of the Earth's crust, such as folding and faulting of the rocks.
<b>Topography</b>	The physical features of the land, especially its relief and contour.
<b>Tsunami</b>	The literal translation means great harbor waves in Japanese. A Tsunami is not a single wave but a series of waves caused by the sudden shift or subsidence of the sea floor which accompanies some earthquakes. Tsunamis are characterized by great speed and may cause considerable damage along on an exposed coast thousand of miles from the source.
<b>Water tables</b>	The upper surface of a zone of water saturation within the ground.

with the Board of Supervisors and the Planning Commission of the County of Santa Clara and the planning agency of each city within the County of Santa Clara. The City Clerk is directed further to file a certified copy of the amendment with the legislative body of each city, the land of which may be included in said plan.

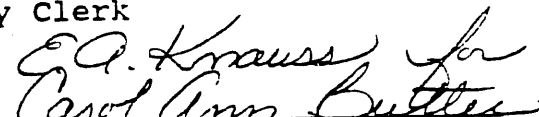
Adopted by the City Council at a regular meeting held on September 28, 1993, by the following vote:

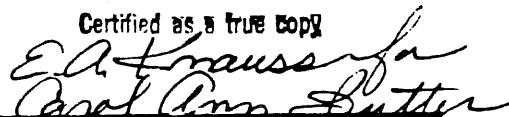
AYES: KAWCZYNSKI, WALDMAN, NAPIER, ROWE, CASTILLO  
NOES: NONE  
ABSENT: STONE, PARKER

APPROVED:

  
Mayor

ATTEST:  
City Clerk

  
By Carol Ann Butler  
Deputy City Clerk  
(SEAL)

Certified as a true copy  
  
By Carol Ann Butler  
Deputy City Clerk of the City of Sunnyvale